On page 18, line 3, before "yielding" please insert - (not shown)--.

On page 18, line 3, please delete "130."

On page 18, line 4, please delete "light" and insert therefor --radiation 120--.

On page 19, line 5, please delete "aperatures" and insert therefor --apertures--.

On page 20, line 3, please delete "aperatures" and insert therefor --apertures--.

On page 20, line 5, please delete "aperatures" and insert therefor --apertures--.

On page 35, line 20, please delete "445" and insert therefor --449--

On page 40, line 1, please delete "ensures" and insert therefor --ensure--.

On page 45, line 16, please delete "the transition is" and insert therefor --their difference is--.

On page 46, line 25, please delete " $[I_{XC}(480),I_{CO}(480)]$ " and insert therefor --

$[I_{xc}(480)^c, I_{co}(480)^c]$ --.

On page 52, line 27, please delete "tissue have" and insert therefor --tissue has--.

On page 57, line 5, please delete "usefl" and insert therefor --useful--.

On page 57, line 5, please delete "classifiation" and insert therefor -- classification

On page 57, line 20, "please delete "can said in" and insert therefor --can aid in--. In the Abstract of the Disclosure, please delete the first paragraph and amend the second paragraph as follows:

At line 1, please delete "LIFAS" and insert therefor Laser Induced Fluorescence

Attenuation Spectroscopy (LIFAS) -. And, please incorporate the third paragraph into the second paragraph.

IN THE CLAIMS:

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Please cancel claims 43-47 of Group II from further consideration in the instant application. As for the remaining pending claims, please amend claims 8, 32, 33, 35, 40, 42, 49, 51-54 and 56 as follows:

| ı 1 | (Amended) [The method of claim 1] A spectroscopic method of analyzing a |
|--------------------------|---|
| 2 | sample, comprising: |
| 3 | irradiating a sample with radiation to produce return radiation from the sample, |
| 4 | wherein the return radiation is modulated by the sample; |
| , to | monitoring a first portion of the modulated return radiation at a first distance from |
| ∤ /& | the sample; |
| 7 | monitoring a second portion of the modulated return radiation at a second distance |
| 8 | from the sample; |
| 9 | processing the first and second portions of the modulated return radiation to |
| 10 | determine a modulation characteristic of the sample, |
| 11 | wherein the return radiation is modulated by attenuation. |
| | |
| 1 , | 3. 36. (Amended) The method claim of [29] 36, wherein the method further |
| 2 | includes determining a physiological property of the biological material using the modulation |
| A\$0 | characteristic. |
| • | 92 |
| 1 | 3\(\beta\). (Amended) The method of claim [30] \(\frac{1}{21}\), wherein the method further includes determining a physiological property of the living tissue using the modulation |
| 2 | includes determining a physiological property of the <u>living</u> tissue using the modulation |
| 3 | characteristic. |
| | |
| 1 | 3/3. (Amended) [The method of claim 33,] A spectroscopic method of analyzing a |
| 2 | sample, comprising: |
| 1 ³ | irradiating a sample with radiation to produce return radiation from the sample, |
| \mathcal{K} $\sqrt{4}$ | wherein the return radiation is modulated by the sample; |
| 5 | monitoring a first portion of the modulated return radiation at a first distance from |
| 6 | the sample: |
| 7 | monitoring a second portion of the modulated return radiation at a second distance |
| | |

| 9 | processing the first and second portions of the modulated return radiation to |
|----------------------------|---|
| 10 | determine a modulation characteristic of the sample; |
| X112 | wherein the sample is biological material; |
| Q ₁₂ | wherein the method further includes determining a physiological property of the |
| 13 | tissue using the modulation characteristic; and |
| 14 | wherein the physiological property of the tissue is hypoxia. |
| | |
| 1 | 39 46. (Amended) [The method of claim 39,] A spectroscopic method for |
| 2 | determining the oxygenation of a biological material, comprising: |
| 3 | irradiating a sample of a biological material with radiation to produce return |
| 4 | radiation from the sample, wherein the return radiation is modulated by attenuation of the |
| 5 | sample: |
| 6 | monitoring a first portion of the modulated return radiation at a first distance from |
| \ \\$\ ⁷ | the sample; |
| ∤ 108 | monitoring a second portion of the modulated return radiation at a second distance |
| 9 | from the sample: |
| 10 | processing the first and second portions of the modulated return radiation to |
| 11 | determine the attenuation of the sample; |
| 12 | determining oxygenation of the sample using the attenuation of the sample; |
| 13 | wherein the oxygenation of the sample is determined by comparing the |
| 14 | attenuation of the sample to the attenuation of a sample having a known level of oxygenation. |
| | |
| 1 | (Amended) A spectroscopic method for determining the concentration of |
| $\Lambda (\lambda^2)$ | hemoglobin in a biological material, comprising: |
| H.P | irradiating a sample of a biological material with radiation to produce return |
| 4 | radiation from the sample, wherein the return radiation is modulated by attenuation of the |

monitoring a first portion of the modulated return radiation at a first distance from

sample;

the sample;

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| 8 | monitoring a second portion of the modulated return radiation at a second distance |
|------|--|
| 9 | from the sample; |
| 10 | determining the concentration hemoglobin in the sample using the attenuation of |
| | the sample; |
| eng. | wherein the concentration of hemoglobin is determined by comparing the |
| 13 | attenuation of the sample to the attenuation of a sample having a known concentration of |
| 14 | hemoglobin. |
| | 11/2 |
| 1 | (Amended) [The method of claim 48,] A method for determining a |
| 2 | physiological characteristic of a biological material, comprising: |
| 3 | irradiating a sample of a biological material with radiation to produce return |
| 110 | radiation from the sample, wherein the return radiation is modulated by the sample; |
| HE | monitoring a first portion of the modulated return radiation at a first distance from |
| 6 | the sample; |
| 7 | monitoring a second portion of the modulated return radiation at a second distance |
| 8 | from the sample; |
| 9 | processing the first and second portions of the modulated return radiation, using a |
| 10 | predictive model, to determine a physiological characteristic of the sample; |
| 11 | wherein the predictive model is a multivariate linear regression. |
| | |
| 1 | (Amended) [The method of claim 48,] A method for determining a |
| 2 | physiological characteristic of a biological material, comprising: |
| (3) | irradiating a sample of a biological material with radiation to produce return |
| 1/4/ | radiation from the sample, wherein the return radiation is modulated by the sample; |
| 5 | monitoring a first portion of the modulated return radiation at a first distance from |
| 6 | the sample; |
| 7 | monitoring a second portion of the modulated return radiation at a second distance |
| 8 | from the sample; |

| 9 | processing the first and second portions of the modulated return radiation, using a |
|-----------|--|
| 10 | predictive model, to determine a physiological characteristic of the sample; |
| 11 | wherein the predictive model is a multicriteria associative memory classifier. |
| í | |
| 1 | (Amended) Apparatus for analyzing a sample, comprising: |
| 2 | a source adapted to emit radiation that is directed at a sample to produce return |
| 3 | radiation from the sample, wherein the return radiation is modulated by the sample; |
| 4 | a first sensor[, displaced by a first distance from the sample,] adapted to monitor |
| 15 | the return radiation at a first distance from the sample and generate a first signal indicative of the |
| la th | intensity of the return radiation; |
| tn | a second sensor[, displaced by a second distance from the sample volume,] |
| 18 | adapted to monitor the return radiation at a second distance from the sample and generate a |
| 9 | second signal indicative of the intensity of the return radiation; and |
| 10 | a processor associated with the first sensor and the second sensor and adapted to |
| 11 | process the first and second signals to determine a modulation characteristic of the sample. |
| | |
| 1 | 53. (Amended) Apparatus for analyzing a sample, comprising: |
| 2 | a source adapted to emit radiation that is directed at a sample volume in a sample |
| 3 | to produce return light from the sample volume; |
| 4 | a first sensor[, displaced by a first distance from the sample volume] adapted to |
| 5 | monitor the return light at a first distance from the sample volume and generate a first signal |
| 6 | indicative of the intensity of the return light; [and] |
| 7 | a second sensor[, displaced by a second distance from the sample volume] |
| 8 | adapted to monitor the return light at a second distance from the sample volume and generate a |
| 9 | second signal indicative of the intensity of the return light; and |
| 10 | a processor associated with the first sensor and the second sensor and adapted to |
| 11 | process the first and second signals to determine a modulation characteristic of the sample. |

| 1 | 54 (Amended) Apparatus for determining a modulation characteristic of a |
|------------|---|
| 2 | biological material, comprising: |
| 3 | a source adapted to emit excitation light; |
| 4 | a first waveguide disposed a first distance from the sample adapted to transmit the |
| 5 | excitation light from the light source to the biological material to cause the biological material to |
| 6 | produce return light and adapted to collect a first portion of the return light, such return light |
| 7 | including fluorescence of the biological matter; |
| //8 //8 | a first sensor, associated with the first waveguide, adapted to measure the intensity |
| ME. | of the first portion of the return light and generate a first signal indicative of the intensity of the |
| 10 | first portion of the return light; |
| 11 | a second waveguide disposed at a second distance from the sample adapted to |
| 12 | collect a second portion of the return light;\ |
| 13 | a second sensor, associated with the first waveguide, adapted to measure the |
| 14 | intensity of the second portion of the return light and generate a second signal indicative of the |
| 15 | intensity of the second portion of the return light; |
| 16 | a processor adapted to process the first and second signals to determine a |
| 17 | modulation characteristic of the biological material. |
| | |
| 1 / | (Amended) Apparatus for determining a physiological property of biological |
| 2 | material, comprising: |
| 3 | a source adapted to emit excitation light; |
| 7 | a first waveguide disposed a first distance from the sample adapted to transmit the |
| \ 5 | excitation light from the light source to the biological material to cause the biological material to |
| 6 | produce return light and adapted to collect a first portion of the return light, such return light |
| 7 | including fluorescence of the biological material; |

the first portion of the return light and generating a first signal indicative of the intensity of the

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first portion;

a first sensor, associated with the first waveguide, for measuring the intensity of

| | · · · |
|--------------|---|
| | |
| 11 | a second wavequide disposed at a second distance from the comple adopted to |
| 12 | a second waveguide disposed at a second distance from the sample adapted to collect a second portion of the return light; |
| 13 | a second sensor, associated with the first waveguide, for measuring the intensity |
| 1 | of the second portion of the return light and generating a second signal indicative of the intensity |
| 1 Q W | of the second portion; |
| 16 | a processor adapted to process the first and second signals to determine a |
| 17 | physiological property of the biological material. |
| | physiological property of the ofological material. |
| | Please add new claims 57-60: |
| | 299, |
| 1 | The method of claim 1, wherein either but not both of the distances is |
| 2 | substantially zero |
| , | |
| 1/ | The apparatus of claim 52, wherein fiber optics transmit the return radiation |
| 7-2h | to the sensors |
| W | |
| \ 1 | 59. A spectroscopic method of analyzing a sample, comprising: |
| 2 | irradiating a sample with radiation to produce return radiation from the sample, |
| 3 | wherein the return radiation is modulated by the sample; |
| 4 | monitoring a first portion of the modulated return radiation at a first distance from |
| 5 | the sample; |
| 6 | monitoring a second portion of the modulated return radiation at a second distance |
| 7 | from the sample; |
| 8 | processing the first and second portions of the modulated return radiation to |
| 9 | determine a modulation characteristic of the sample; |
| 10 | wherein the sample is biological material; |
| 11 | wherein the method further includes determining a physiological property of the |
| 12 | tissue using the modulation characteristic; and |
| 13 / | wherein the physiological property of the tissue is ischemia |
| (| 9 |